

AMENDMENTS TO THE CLAIMS:

1-3. (Canceled)

4. (Currently Amended) A drive circuit for an electric submersible pump, comprising means for generating cyclically varying voltage waveforms in which ~~[[the]] a~~ voltage varies ~~substantially-smoothly~~ progressively during each transition between an upper voltage level and a lower voltage level and in which the voltage remains at substantially the upper voltage level for first ~~predetermined~~ extended periods between successive transitions and the voltage remains at substantially the lower voltage level for second ~~predetermined~~ extended periods between successive transitions interleaved with said first periods, and output means for applying said voltage waveforms to energise a plurality of phases of a motor driving the electric submersible pump.

5. (Previously Presented) A drive circuit according to claim 4, wherein the generating means is adapted to drive all of the phases of the motor simultaneously to prevent the generation of voltage spikes in the motor.

6. (Previously Presented) A drive circuit according to claim 4, wherein the generating means comprises a variable voltage source for supplying the difference between the upper voltage level and the lower voltage level, and switching means for alternately applying the voltages at the upper and lower voltage levels supplied by the variable supply voltage source.

7. (Currently Amended) A drive circuit according to claim 6, wherein the switching means is adapted to vary the time-dependent sequence with which the upper and lower voltage levels are applied in order to provide the ~~substantially-smooth~~ transitions between the upper and lower voltage levels.

8. (Previously Presented) A drive circuit according to claim 7, wherein the switching means is adapted to vary the time-dependent sequence with which the upper

and lower voltage levels are applied to the output means in order to provide pulse width modulated output voltages at the transitions.

9. (Previously Presented) A drive circuit according to claim 6, wherein the switching means is adapted to apply the voltages at the upper and lower voltage levels to filter means for applying said waveforms to energise the phases of the motor by way of the output means.

10. (Previously Presented) A drive circuit according to claim 6, wherein the variable voltage source is adapted to control the speed of the motor at higher speeds.

11. (Currently Amended) A drive circuit according to claim 6, wherein the variable voltage source is adapted to non-linearly modulate the switching means so as to ~~provide waveforms having portions in which the voltage is maintained at substantially the upper and lower voltage levels for~~ ensure that the first and second periods are extended periods of time.

12. (Previously Presented) A drive circuit according to claim 6, wherein the variable voltage source is adapted to vary its internal frequency with output so as to improve efficiency.

13. (Previously Presented) A drive circuit according to claim 6, wherein the variable voltage source comprises chopper means for chopping a fixed voltage in a variable time-dependent sequence in order to supply the voltages at the upper and lower voltage levels.

14. (Previously Presented) A drive circuit according to claim 13, wherein the chopper means comprises capacitance means connected to first and second fixed supply voltage sources, and selection means for selectively applying the voltage defined by the first and second fixed supply voltage sources.

15. (Previously Presented) A drive circuit according to claim 14, wherein the chopper means is adapted to vary the duty cycle of the selection means to adjust the voltage across the capacitance means.

16. (Previously Presented) A drive circuit according to claim 6, wherein the variable voltage source comprises a poly-phase boost converter adapted to supply the difference between the upper voltage level and the lower voltage level from a poly-phase supply.

17. (Previously Presented) A drive circuit according to claim 4, wherein the generating means comprises transformer means having a first secondary winding constituting a first fixed supply voltage source and a second secondary winding constituting a second fixed supply voltage source.

18-35. (Canceled)

36. (New) A drive circuit according to claim 4, wherein the voltage varies substantially smoothly during each transition between the upper and lower voltage levels.

37. (New) A drive circuit according to claim 4, wherein the first and second periods are each greater in duration than a transition between the upper and lower voltage levels.

38. (New) A drive circuit according to claim 4, wherein, when energised, a phase has the lowest associated current during each transition between the upper and lower voltage levels.